

A green tractor is shown in the middle ground, pulling a seeding implement across a field. The field is dark and appears to be recently tilled or seeded. The background shows a rolling hill under a blue sky with scattered white clouds. The text is overlaid on the image in a yellow serif font.

Factors to Consider when Designing Seeding Practices

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Site Improvement and Restoration

Stabilize Major Disturbances

- Wildfire/sagebrush loss
- Grazing impacts
- Weed invasion
- Watershed and soil stabilization



Grazing



Wildfires /
sagebrush loss



Invasives



Wildlife habitat

Determine Project Objectives

- Sustain ecological processes
- Alter plant succession
- Improve community diversity and integrity
- Provide stability in production
- Weed management



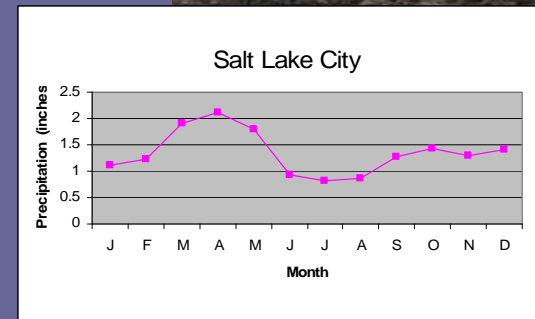
Define Implications to Existing Resources

- Ecological stability
- Wildlife Habitat
- Watershed and Soil Values



Assessment of Existing Environmental and Physical Conditions

- Evaluate soil and climatic conditions
- Site potential
- Precipitation – amount and distribution
- Soil surface condition
- Accessibility
 - > Topography
 - > Site variability
 - > Dissected surfaces
 - > Rock and physical barriers



Define Existing and Potential Vegetation

- Presence and condition of native species
- Weedy species present
 - > Live plants
 - > Seed banks



Define Equipment Capabilities for:

- Creating required seedbeds
- Successfully seeding and establishing desired species
- Retention of desirable plants
- Retention of biological soil crusts
- Control of weeds

Species Selection

- Determine species compatibility
- Variation in seedling emergence and establishment



Grasses

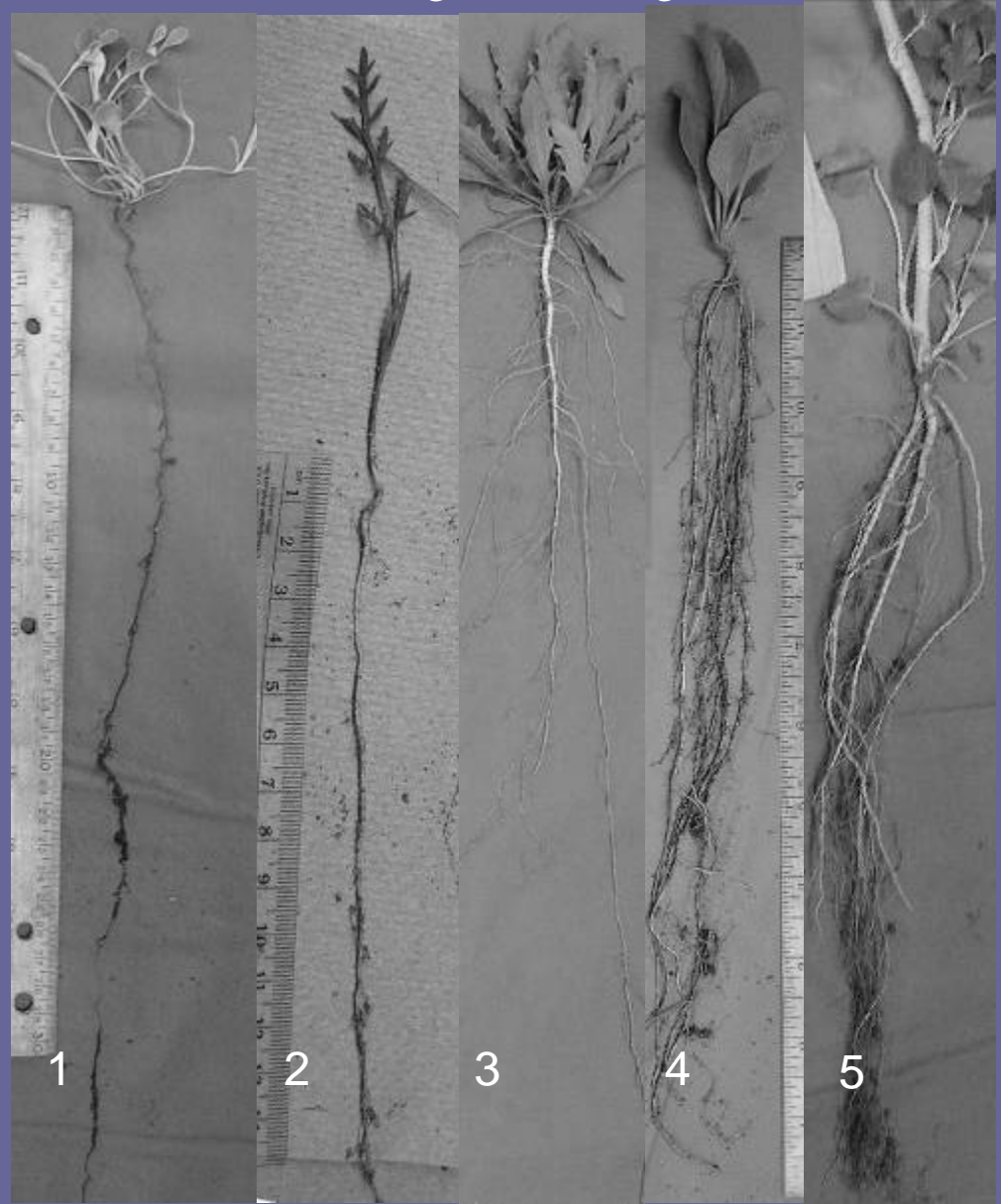
- Needle-and-thread
- Thurber needlegrass
- Bluebunch wheatgrass
- Sandberg bluegrass
- Western wheatgrass



Forbs

12 weeks greenhouse growth

- 1 Sulfur-flower buckwheat
- 2 Biscuitroot
- 3 Hoary tansyaster
- 4 Royal penstemon
- 5 Munro globemallow



Photos:
H. Parkinson

Shrubs

- Big sagebrush
- Rabbitbrush
- Fourwing saltbush
- Saskatoon serviceberry
- Antelope bitterbrush



Factors Influencing Plant Establishment and Success

- Seed morphology - size, shape, appendages
- Seed purity, germination requirements
- Seed stratification requirements
- Seedbed requirements
- Seedling growth capabilities
- Competition – intraspecific and interspecific

Diverse seed mixes are great but...

Seedbed Requirements

Seeding Depth and Rates

Species Interactions

Seed Shapes and Sizes

Seed Appendages

Slide by
Rob Cox

Drill Configuration



Slide
by
April
Hulet

Drill Configuration



Slide
by
April
Hulet

Broadcast Mix

Species

- Wyoming big sagebrush
 - Rubber rabbitbrush
 - Western yarrow
- Sandberg bluegrass
 - Blue penstemon

Artemisia tridentata ssp. *wyomingensis*

Wyoming big sagebrush



2,500,000 seeds/lb



Ericameria nauseosa rubber rabbitbrush



700,000 seeds/lb

Penstemon cyaneus blue penstemon



595,000 seeds/lb

Drill Mix

Species

- Indian ricegrass
- Bluebunch wheatgrass
- Bottlebrush squirreltail
- Sulfur-flower buckwheat

Achnatherum hymenoides

Indian ricegrass



Pseudoroegneria spicata bluebunch wheatgrass



185,000 seeds/lb



Krascheninnikovia lanata
winterfat

Fluffy seed



125,000 seeds/lb (with bracts)
200,000 seeds/lb (without bracts)

Broadcast Mix

Species	Germination (%)	Purity (%)	% Pure live seed	Seeds/lb pure seed	PLS/ bulk pound
Wyoming big sagebrush	80	12	10	2,500,000	240,000
Rubber rabbitbrush	75	12	9	700,000	63,000
Western yarrow	80	50	40	2,700,000	1,080,000
Sandberg bluegrass	85	95	81	925,000	746,938
Blue penstemon	77	73	56	595,000	334,545

Broadcast Mix

Target: 60 PLS/ft² total mix.

Broadcast mix = 50% of mix = 30 PLS/ft².

Species	% of mix	PLS/ft ²	PLS/acre	Bulk rate lbs/acre	PLS rate lbs/acre
Wyoming big sagebrush	10	6	261,360	1.09	0.10
Rubber rabbitbrush	10	6	261,360	4.15	0.37
Western yarrow	10	6	261,360	0.24	0.10
Sandberg bluegrass	15	9	392,040	0.52	0.42
Blue penstemon	5	3	130,680	0.39	0.22
Subtotal	50	30	1,306,800	6.40	1.22

Drill Mix

Species	Germination %	Purity (%)	%Pure live seed	Seeds/lb pure seed	PLS/ bulk pound
Indian ricegrass	86	100	86	205,000	175,771
Bluebunch wheatgrass	93	93	86	185,000	159,576
Bottlebrush squirreltail	94	97	92	190,000	173,974
Sulfur-flower buckwheat	97	66	64	184,000	117,922

Drill Mix

Target: 60 PLS/ft² total mix.

Drill mix = 50% of total or 30 PLS/ft².

Species	% of mix	PLS/ft ²	PLS/acre	Bulk rate lbs/acre	PLS rate lbs/acre
Indian ricegrass	10	6	261,360	1.49	1.27
Bluebunch wheatgrass	20	12	522,720	3.28	2.83
Bottlebrush squirreltail	10	6	261,360	1.50	1.38
Sulfur-flower buckwheat	10	6	261,360	2.22	1.42
Subtotal Broadcast	50	30	1,306,800	8.48	6.90
Subtotal Drill	50	30	1,306,800	6.40	1.22
TOTAL	100	60	2,613,600	14.88	8.11

Seedling Establishment????

Planting	% of mix	PLS/acre	Plants/acre	Plants/ft ²
			(2% establishment)	
Broadcast	50	1,306,800	26,136	0.6
Drill	50	1,306,800	26,136	0.6
Shrubs	20	522,720	10,454	0.2
Forbs and grasses	80	2,090,880	41,818	1.0

Special considerations:

	Germination	Purity	%Pure live seed	Seeds/lb pure seed	PLS/bulk pound
Species	%	%			
Winterfat	85	50	43	112,270	48,276
Spiny hopsage	80	75	60	165,000	99,000
Fernleaf biscuitroot	70	90	63	45,000	28,350
Fourwing saltbrush	50	95	48	50,000	23,750
Antelope bitterbrush	90	95	86	18,000	15,390
Sulfur-flower buckwheat	97	66	64	184,000	117,922



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